Concrete in ventilated facades for natural cooling of buildings. SINHOR project

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SUMMARY

The framework in which the SINHOR project takes place is the "Service Contract R + D + i Relating to Competence Scope of the Ministry of Public Works and Housing" with the research project entitled "Analysis of the energy performance of closures concrete based on maximizing the benefits derived from the thermal inertia".

Meeting the "20-20-20" targets for reduction of CO_2 emissions necessarily involves a drastic reduction of energy consumption in buildings.

SINHOR project is oriented to promote the use of concrete solutions in buildings based on maximizing the benefits of its thermal inertia for both heating and cooling periods.

The active solution developed has two configurations, one for summer (cooling mode) and another for winter (heating mode). In the cooling mode, the constructive solution is similar to a ventilated facade that is formed by a thermally insulated outer layer of concrete, an intermediate air layer and an inner layer of concrete. The inner layer is cooled at night by forced ventilation using an outdoor - outdoor scheme. The concrete building facades are used as heat sinks. The aim is to cool the inner layer of concrete moving outdoor air through the air layer during night taking advantage of the low nigh-time air temperatures. The cool stored is released to the interior spaces when the maximum peak load of the space takes place (see figure).

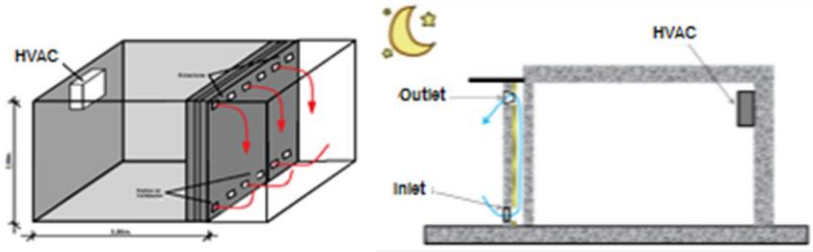

Figure: module test for the analysis of the influence of night cooling of the concrete wall through the chamber ventilated by forced ventilation.

The aim of the presentation is to show the potential of special concrete walls as solutions to reduce energy demand in residential buildings by heat storage and thermal offset in Spanish Mediterranean climates.